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# USSR Report

TRADE AND SERVICES

(FOUO 11/79)



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USSR REPORT  
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CONSUMER GOODS AND DOMESTIC TRADE

IMPROVING MATERIAL-TECHNICAL BASE FOR INDUSTRIES DISCUSSED

Moscow VOPROSY EKONOMIKI in Russian No 4, Apr 79 pp 85-93

[Article by A. Khodzhayev, L. Meyerovich: "The Material-Technical Base of Group B Industries"]

[Text] The economic strategy of the CPSU is oriented toward raising the people's material and cultural standard of living and anticipates an expansion of production and an improvement in the quality of consumer goods. As was emphasized at the 25th Congress of the CPSU, however, we cannot now "hope for any continuous favorable development within Group B or an improvement in the quality of goods and services without an introduction into this area of the latest advancements in contemporary science and thinking on design, without a strengthening of the technical base of the light and food industries...."

The current state and prospects for further modernizing the Group B technical industrial potential is a function of the level of development in the area of light- and food-industry machine building, an industry comprising approximately 200 associations and enterprises and for more than 13 years now existing as an independent branch of the USSR's machine-building industry. This industry's independent organizational structure took shape in 1965 with the transfer of formerly separate enterprises manufacturing industrial equipment for the light, food and printing industries; the production of chemical fibers, mills and elevators; for commerce and public dining services, as well as those producing household appliances and spare parts to the jurisdiction of the newly created Ministry of Machine Building for the Light, Food and Household Appliance Industries of the USSR (Minlegpishchemash). Minlegpishchemash USSR is now the primary supplier of industrial equipment for Group B industries. Equipment turned out by its enterprises, for example, for the light and food industries comprises almost 90 per cent of the total volume of equipment deliveries for these industries.

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Responsibility for the development of a single industrial policy and for studying and satisfying consumer interests rests with specialized All-Union Industrial Associations (VPO), within which material and labor resources are concentrated and scientific research and design centers organized (10 VPO now function within the Minlegpishchemash USSR system). This has made it possible to develop standardized equipment families, the production of which, on the one hand, increases the efficiency of machine-building enterprise operations and, on the other, satisfies the diverse requirements of the industries supplied. The looms, for example, being produced for subbranches of light industry and comprising a design series are several times less labor-intensive than those formerly used<sup>1</sup>.

During the course of the past five-year plan alone, Minlegpishchemash enterprises have mastered and assimilated the production of 1515 different items of modern equipment, which in 1977 comprised more than 70 per cent of its total production. The greatest part of this new equipment has been supplied to replace outdated machines and machine tools; the production of advanced types of equipment--shuttleless and automatic pneumatic-dagger looms, pneumatic spinning machines, automatic packaging machines for the food industry and so on--has been developed at an accelerated pace. The Ninth Five-Year Plan saw an increase in the ability of our domestically produced equipment to compete in world markets (it is now exported to more than 60 countries). The introduction of new equipment has been directed toward not only the mechanization of labor and increasing its productivity, but also toward the creation of favorable industrial working conditions--a reduction in shop noise levels, optimizing temperature conditions in operations areas, eliminating contamination and dust and overcoming the negative consequences stemming from the effect of various production processes on the human organism. At the same time, however, with respect to both its total volume and its quality and performance characteristics, the new equipment which has been supplied still does not fully measure up to the requirements of the light and food industries. The success which has been achieved notwithstanding, production growth in these industries during the Ninth Five-Year Plan was below that called for by the Directives of the 24th Congress of the CPSU; tasks involved in mastering and assimilating the production of individual types of goods have not been accomplished; departures have been permitted from the planned products list: of 34 items studied by the TsSU SSSR [Central Statistical Administration of the USSR], fewer than half accorded with the level called for by plan figures.

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The list of equipment manufactured by Minlegpishchemash USSR enterprises runs to 5300 items of different descriptions. But this equipment assortment fails nevertheless to satisfy current consumer-industry demand in this area. Our domestic machine-building industry is not producing the most important equipment necessary for more fully utilizing raw agricultural products, expanding production assortment and introducing and assimilating the manufacture of new types of products or equipment for mechanizing heavy manual operations, particularly those occurring during the initial and final stages of the production cycle<sup>2</sup>.

Research and development work and the assimilation and mastery of several types of new equipment are proceeding at only a slow pace. In some instances, the time required to ready new technology for series production runs to 10 years and longer, which leads to the new product's becoming outdated before it even reaches the stage of industrial manufacture. This occurs because the individual stages of the cycle, statement of basic requirements-engineering tasking-draft design-test model-testing-series production, are not properly coordinated with each other and are not always in line with consumer interests and capacities<sup>3</sup>.

Remedying these shortcomings requires above all strengthening the scientific and planning and design base of the machine-building industry. This will involve additional capital investment, especially since until recently a base like this oriented toward individual Group B industries for all practical purposes did not exist. But it is possible even now to bring some order into the utilization of our existing resources. What we are referring to here is a gradual transfer to Minlegpishchemash of the NII [scientific research institutes], KB [design bureaus] and experimental (testing) facilities currently existing within the light and food industry system. This will make it possible to eliminate overlapping and duplication in the work carried on by individual institutes and design bureaus under the jurisdiction of various departments, concentrate our efforts in the process of working out programs for the development of new technology, accelerate the process of production testing and increase the machine builders' responsibility for performing the testing. With respect to industries purchasing new equipment, it would be to advantage for them to provide timely statements of their basic requirements and some estimate (based on a study of their needs and resources) of the long-term demand for the equipment to be ordered.

There needs to be improved coordination between all departments concerned, this to be achieved by modifying the procedures involved in the planning and design, manufacture and delivery and in the testing of equipment prototypes. So long as there is no great number of test facilities available within the Minlegpishchemash system, it will remain an indispensable requirement

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for these measures to be included in plans for new consumer-industry equipment. Difficulties will otherwise inevitably arise in setting up for equipment testing and assembly and in searching out additional sources of financing, raw materials and manpower. Seasonal fluctuations in the operations of some branches of the food industry need also to be taken into consideration, since in a number of instances equipment can be properly tested only during periods of mass-scale raw-product processing. Failure to take these considerations sufficiently into account results in disruption and interference with planned testing conditions, while a decision on the advisability of going ahead with series production of the equipment is postponed to a later time. Furthermore, equipment also becomes outdated while it is still in the process of manufacture as a result of slow model replacement and late incorporation and mastery of new equipment components on the part of individual ministries, particularly Minelektrotekhprom (Ministry of the Electrical Equipment Industry and Power-Industry Machine Building), Minpribor (Ministry of Instrument Making, Automation Equipment and Control Systems) and others. Some types of equipment therefore "figure in the accounts as 'new,' while in fact they are new only with respect to the date of manufacture and not to the level of technology they represent."<sup>4</sup> Of all the equipment series produced for the food industry, for example, one-third has reached production only after a 10-year period or longer.<sup>5</sup>

The manufactured output of high-efficiency equipment for the textile industry has achieved a surpassing rate of growth within recent years, but it still comprises only a small proportion of the total volume of equipment production: the proportion of BD-200 pneumatic spinning machines in the total 1977 spinning machine production was 14.6 per cent; of all the looms manufactured during the same year, the STB shuttleless and the ATPR automatic pneumatic-dagger looms accounted for 20 and 31 per cent respectively.<sup>6</sup> Characteristically, it was the production of precisely the most advanced types of equipment that was lagging behind. The sewing industry's demand for the 97-A and 1022 classes of machines for stitching light, medium and heavy fabrics has been almost completely satisfied in recent years. In 1976, the plan for the production of these machines exceeded stated demand for them 3.9 fold and 3.7 fold in 1977, which made it possible to provide Minlegprom SSSR (Ministry of Light Industry of the USSR) with its full allocation of capital goods. But the plan called for meeting only one-third of the demand for more advanced equipment, the class 997 machine, since the machine-building capacity in this instance was limited. A similar situation has taken shape in the case of other types of advanced equipment as well--looms, pneumatic spinning and carding machines and automatic flat-bed equipment among other types.

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We should also point out the difficulties arising in the process of getting the products of the machine-building industry to consumers. Only slight use is being made of such advanced arrangements as technical consultation and monitoring of assembly and installation procedures and the delivery on a "turnkey" basis of equipment to be assembled and installed, which are especially important in the case of fundamentally new technology. But as things stand now, the supplier is customarily relieved of responsibility when the finished product is shipped to the consignee.

These problem areas in the development, assimilation and mastery of new technology are aggravated by overall shortfalls in deliveries of equipment for Group B industries. During the course of Ninth Five-Year Plan and in recent years as well, there have occurred shortfalls in deliveries of equipment even for areas of allocated capital goods, even though these do not reflect actual demand. According to our calculations, neither planned nor, what is more, actual satisfaction of demand for equipment (in terms of value) for subbranches of the light and food industries reached 100 per cent during the entire period from 1971 to 1977.

In connection with the fact that disproportions in the provision of equipment for Group B industries emerge as early as the very stage of its production planning, it can be stated that the current level of development in machine building for the light and food industry does not measure up to growing demand on the part of consumer industries.

From the point of view of its ultimate impact on individual subbranches, the dimensions of this gap are rather considerable. The 1977 plan, for example, called for equipment demand in the yeast, margarine, starch-syrup, perfume, tobacco and textile industries to be met by only half; and by 60 per cent for the confectionery, macaroni, bread-baking, tea, leather footwear and meat and dairy industries. A serious situation has arisen in these industries with respect to the supply of spare parts. It should be pointed out that Minlegpishchemash manufactures no spare parts at all for imported equipment in operation or for equipment in enterprises which has been withdrawn from the production process but is still operational.

Analysis of the satisfaction of Group B industry equipment demand performed on the basis of value indicators should be supplemented by calculations in real physical terms of equipment actually delivered. The results of such a study of branches of the food industry indicate that, calculated in real, physical terms, the level of both planned and actual supply of equipment was lower than when calculated in terms of value. In other words, failure to fulfill overall plans for equipment deliveries is aggravated by departures from the given (required) equipment product list in

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favor of more costly items. With poor contracting discipline, an orientation on the part of machine-building enterprises toward value indicators (in the first instance toward production volume sold as a basic operations evaluation indicator) encounters no serious resistance on the part of Group B industries since the more expensive equipment is also in short supply. A situation has therefore been created in which the machine-building industry is given inadequate incentive to produce all the required types of equipment in the necessary quantity.

Taking on great importance in this connection is the statute which has been put into effect governing material incentives for fulfilling in real, physical terms the obligations assumed in contracts and orders with respect to assigned product lists. These indicators provide a more accurate reflection of real economic demand and the degree to which it is being satisfied, although they are still little utilized for analysis purposes even in the consumer industries concerned despite the fact that it is on the basis of precisely these indicators that equipment shortages can be objectively analyzed.<sup>7</sup> Available statistical data do not allow us to speak with sufficient accuracy concerning the scale on which disproportions exist since when equipment requirements are being planned, actual industry needs are in practice frequently overstated. It should be pointed out that there exists in fact no analysis of the justification for the preparation of equipment orders for a planning period, but since enterprises continually encounter reductions in allocated capital goods as compared with stated requirements, there naturally develops a tendency to try to obtain excess equipment. Some economists who have studied these problems<sup>8</sup> believe that the quantity of capital goods allocated is rightly to be considered a requirement "accepted" and legalized by society. From this point of view, the difference between the actual goods and the orders indicates the extent of the overstatement. It is hardly possible to agree with this view for the reason that the amount of capital allocated is, in its turn, established, not on the basis of an analysis of actual equipment requirements, but rather on the basis above all of current supplier-enterprise capacity. The only thing that is recognized, in other words, is the demand that can be satisfied on paper. But as a rule, objective demand proves to be something entirely different. The available data, moreover, provide evidence for the fact that even the so-called "acceptance" of a requirement still does not guarantee to enterprises their actual equipment deliveries, their occasionally being accomplished, on the contrary, at a tenfold reduction as compared with the requirement as originally stated. Reductions like this cannot be attributed simply to adjustments made in incorrectly prepared orders. According to available analyses, overstatements of their requirements on the part of enterprises do not exceed 50-100 per cent. Consumers which order equipment

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and then contract for its delivery occasionally subsequently cancel their orders, which disorganizes the operations of machine-building enterprises.

There arises in this connection the problem of the need to develop an improved method of determining requirements for specific types of equipment. The development of a procedure for establishing equipment requirements for the light and food industry is of importance, not only for current, but also for long-term planning for the development of the machine-building industry. We can, on the basis of forecasts of finished consumer goods production, and taking into account equipment life and the timeliness and efficiency with which it is replaced, achieve a more efficient utilization of investment capital and arrive at a scale of preferences regarding the modernization or the construction of new machine-building enterprises. There would appear in this case the possibility of planning the elimination of the short supply of one or another group or type of equipment.<sup>9</sup>

Also of importance is the question of the technical and economic specifications for equipment to be manufactured and the selection of those that are to take precedence. According to figures of the Ministry of the Food Industry of the USSR, for example, only 45-50 per cent of the equipment manufactured for this industry measures up to current technological levels. But the fact is that at the present time only the productivity index of a machine, machine tool or line is frequently taken as the criterion for evaluating technological innovation. This is not sufficient in our view. Domestically produced equipment is in many instances in no way inferior as regards productivity to the best foreign-made equipment, but the achievement of this equality is linked with a drop in other indices no less important to consumers, in particular those for energy consumption, weight, overall dimensions and so on. Moreover, from a purely economic point of view, the employment of equipment achieving the highest productivity is in a number of instances not economically advantageous. An excessive concentration of capacity in the food industry, for example, may generate an increase in volumes of raw product shipments and consequently cause product loss and an increase in disruptions and irregularities in supply and expenditures for the distribution and shipment of finished production to the consumer. Furthermore, the efficient utilization of high-productivity technology assumes the creation of the special conditions required for its operation. Equipment like this has to be installed in facilities with ample space insuring the feasibility of changing over to automated and mechanized systems. The adaptation of new equipment to existing facilities reduces the efficiency with which it can be employed and leads to the appearance of labor-intensive operations at "junction points" where there is a preponderance of unskilled labor. New technology imposes other operational requirements as well--special ventilation and controlled humidity conditions and so on. Satisfying them in

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light- and food-industry enterprises within a brief period of time will hardly be practicable; the preparation of long-term equipment orders should therefore take into consideration individual branch capacities; and the advisability of equipment utilization should be undertaken on the basis of all the indices characteristic of its technical and economic level. Furthermore, no matter what the specifications of the equipment employed may be, its true performance will be a function of the specific factors of production prevailing at each enterprise--the quality of the raw product, the skill levels of personnel and manpower organization.

It is also necessary to keep in mind the social aspects of the problem. New equipment differs to advantage from the similar items it has replaced with respect to its reduced noise levels, less vibration, ease of operation, decreases worker fatigue and so on. Emerging as a bottleneck is the absence on many production lines of equipment to mechanize operations, particularly those involved in the initial and final stages of the production cycle.

Domestically produced equipment is seldom supplied with the auxiliary units required for loading the raw product, unloading or removing the finished product or for weighing, marking and packaging. Occupied with these operations as a result are considerable numbers of auxiliary service personnel with a low level of labor mechanization. In our view, current policy governing the effort to improve manpower utilization should in the meantime be directed in the first instance toward those workers whose labor is expended the least efficiently and is difficult and held in low esteem. The situation prevailing with respect to supplying Group B industries with equipment is compelling enterprises to extend the service life of capital goods currently in operation, circumstances which result in the maintenance of a high proportion of thoroughly outdated equipment in the total inventory of equipment in place. It should be kept in mind that the short supply of equipment and the length of time it remains in operation are closely interrelated. Any shortfall in the delivery of new equipment or its delivery with incompletely developed structural or design features produces a negative impact on the effort to accomplish plans for production output and compels enterprises to continue employing existing outdated production equipment, which in turn limits the possibility of expanding production and leads to a decline in indicators of the level of technical and economic performance.

At the present time, therefore, the possibilities for exploiting the available potential for growth in labor productivity, increasing production volume and improving the quality of light- and food-industry products depends on improvement of the material-technical base of Group B industries. One potential area of

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exploitation is possible on the basis of the development of new technology and the replacement of outdated producer goods, which will make it possible to free up and redistribute those already in operation, to improve the structure of the labor force and the conditions in which it is employed and to reduce idle time and losses in operations time due to unplanned repairs required on defective equipment.

The exploitation of potential in another area is possible and conditional upon achieving required capacities for the industrial processing of raw agricultural products. Disproportions in this area are altogether intolerable at this time inasmuch as many kinds of agricultural products remain in critically short supply. Maximum utilization of the raw product being supplied is therefore a most important task for the processing industry. Calculations indicate, for example, that by making fuller use of the raw product during the production of sausage and dairy products, 1.5 million tons of meat and 10 million tons of milk could be saved in the course of the Tenth Five-Year Plan. This process, meanwhile, encounters obstacles in individual instances on account of equipment shortages or deficiencies in its operation. As a consequence of a lack of equipment for separating meat from bone, for example, meat losses run to approximately 8 per cent of total production.<sup>10</sup> There is a shortage of equipment for manufacturing various semifinished products and there is only limited capacity available in refrigerating facilities.<sup>11</sup> During 1976 alone, enterprises of Minmyasomolprom SSSR /Ministry of the Meat and Dairy Industry of the USSR/ underproduced for these reasons to the extent of more than 110 million rubles. Production volumes could also have been greater in the areas of other food products, such as, for example, macaroni, margarine, fats, beer and nonalcoholic beverages.

In addition to direct losses of raw agricultural products, there are those which could be termed indirect. These occur in connection with the fact that a lack of required equipment, a condition which limits the assortment of manufactured output, results in disproportions between supply and demand, as a result of which a manufactured finds no market. The problem of satisfying consumer demand is not limited, of course, to the production of the necessary equipment. Its solution without this component, however, is impossible, a fact which is confirmed in particular by the example of fabrics enjoying a consumer demand, but whose manufacture with complex thread weave and multicolored patterns is hampered by a shortage of dobbies for looms. In utilizing their available equipment, enterprises are frequently unable to keep up with the requirements of fashion and operate for prolonged periods of time in accordance with unchanged production plans, which is particularly the case in the sewing and footwear industries. As regards food-industry products, the use of different packaging and wrapping equipment and the fine packaging of finished products would contribute here to a fuller satisfaction of consumer demand.

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Experience indicates that the most promising way to solve this problem is to increase the volume of packaged output immediately at its point of manufacture, that is, within the industry. At the present time approximately 70-80 per cent of all food products go on the market in packaged form in the CSSR [Czechoslovak Socialist Republic], the GDR [German Democratic Republic], Poland, Hungary and Romania. In our country the proportion of industrially packaged goods reaching the market does not exceed 50 per cent. The main reason for this is the insufficient technical provisioning of industrial enterprises with respect to packaging and wrapping equipment and the low productivity and defects in its manufacture.

The state of the material-technical base for our Group B industries to a great extent determines the level of consumer goods production and the possibility of tapping yet unexploited potential. It was pointed out at the 25th Congress of the CPSU that the paramount importance of enhancing our well-being is still far from being realized by all economists and managerial personnel. Despite the fact that over the course of the period during which Minlegpishchemash SSSR has been in existence its fixed capital has grown 2.5-fold (a figure which includes a 1.7-fold growth during the Ninth Five-Year Plan); its machine inventory has grown 1.6-fold and its quality has been enhanced; and that the amount of scientific research work under way has increased 2-fold, these rates of growth are clearly inadequate. It should be kept in mind that included in Minlegpishchemash when it was being organized were many small enterprises which were formerly repair shops with outdated equipment. Food-industry machine building was virtually recreated. But there has been no rapid pace set in the process of modernizing and building new plants; year after year the resources allocated for these purposes have not been fully utilized; and the contracting construction ministries have not included Minlegpishchemash projects among their top-priority items. The periods of time required to bring new production capacity into operation are regularly prolonged as a result. With respect to this indicator, for example, the plan as a whole during the Ninth Five-Year Plan was fulfilled by only 75 per cent. This limits the possibilities of developing technology measuring up to present-day standards, since being complex in design and construction and in the precision required in its manufacture, the equipment involved here frequently cannot be produced in existing enterprises.

A shortage has developed within the industry of up-to-date metal-cutting equipment. There is a preponderance of machine tools for rough finishing work, but there is an insufficient number of machines for finishing operations and of units of other specialized equipment and inadequate mechanization of auxiliary, warehousing and transportation operations. Minlegpishchemash has now laid out the basic directions it will follow in its long-term development of modern equipment. But the implementation and fulfillment

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of these plans requires that they be linked with the requisite supply of allocated raw products, materials and full complements of new component items. Procedures for planning the supply of resources also need to be improved, since even when the orders submitted are fully filled the existing procedures provide no guarantee against possible disproportions.

The industry is experiencing its greatest needs in the areas of ferrous and nonferrous cast products, rolled metal products, stainless sheet steel and polystyrene. It is for this reason that for a number of years the plans have not been fulfilled in the area of dyeing-and-finishing equipment production, as well as in those of several types of equipment for the food, meat and dairy and fish industries.

The development of a new machine-building industry has complicated interindustry ties, and many supplier enterprises have proved to be poorly prepared for this. We know that it is not to advantage for the industry to engage in the production of items which are not characteristic of it. But Minlegpishchemash has had to occupy itself with this because of the impossibility of satisfying its plan requirements through cooperation.

Strengthening the machine-building base for the light and food industries will contribute to the efficient utilization of foreign experience and know-how in the area of the development of equipment for these industries, in particular by way of purchasing licenses. Licenses are now being purchased on an inadequate scale, especially in the area of food-industry equipment, due to the limited possibilities for manipulating machine-building resources. Part of the necessary equipment has therefore had to be imported.<sup>12</sup> Purchased abroad during the Ninth Five-Year Plan were complete units of equipment for dairies and cheese-making plants, canned ham plants, down and feather processing factories, gelatin-making shops, individual lines for the production of sausage, bologna, butter and other products. Enterprises in the bread-baking, macaroni, confectionery, beer and nonalcoholic beverage, tobacco, preserved food and the textile and knitwear industries were also supplied with imported equipment. Despite the fact that equipment imports are an important and necessary means of accelerating the supply of Group B industries with advanced technology, continued growth in volume in this area is restricted primarily by foreign exchange limitations. This limitation has been aggravated in recent years by the trend of rising prices for equipment on the world market, in connection with which increases in equipment purchases and an expansion of the range of products purchased require continuously increasing additional allocations. In other words, the increasing cost of imports is not accompanied by an adequate change in its physical volume.<sup>13</sup> It should also be kept in mind

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that the imported equipment has been developed taking into consideration the local supply of raw products and materials and that these have been employed as a basis for the testing it undergoes. In a number of instances, many of the components required for the operation of imported equipment are either not manufactured at all by our industry (containers, packaging materials) or are produced in insufficient quantities or in a different condition or of another quality (agricultural products). In connection with the fact that in most instances it is impossible to test imported equipment using domestically produced raw products prior to purchase, a situation arises which results in either the necessity of additionally importing the raw products required for the operation of the foreign equipment to be installed or to its inefficient operation due to underutilization of its capacity and periods of idle time. In a number of instances, moreover, in consequence of limitations on resources or inadequate supplies of raw product, equipment has been purchased which was manufactured in preceding years and which was inferior to the most recent models with respect to its technical and economic performance indicators. There are therefore certain limits to the advantage to be derived from imports as a source on which to base the development of an up-to-date material-technical base for Group B industries. And while imported technology now has a large role in light industry, and especially in the food industry, these industries will nevertheless be orienting themselves increasingly toward domestically produced equipment at the rate permitted by the development of the corresponding subbranches of our own machine-building industry.

The light and food industries are of continuously increasing importance in providing the population with food products and other consumer goods, and in accordance with the decisions of the July (1978) plenum of the CC CPSU the long-term task has been set of accelerating the development of these industries.

## FOOTNOTES

1. See D. M. Palterovich, "Park proizvodstvennogo oborudovaniya" [The Inventory of Producer Goods], Nauka, 1970, pp 76-77.
2. For example, 450 type sizes of machines and other equipment are manufactured for meat and dairy enterprises. According to figures from the Ministry of the Meat and Dairy Industry of the USSR, the production of another 220 type sizes of lines, equipment, units and other machines is necessary for more complete utilization of raw products and, consequently, for increasing production output, expanding its assortment and for eliminating labor-intensive manual operations.

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3. Of planned items of current equipment running to 180 descriptions for the meat and dairy industry during the Ninth Five-Year Plan, only 84 went into series production; of the 250 items of production equipment for other branches of the food industry, fewer than half were incorporated into production. And the situation is changing only slowly during the Tenth Five-Year Plan. Of 222 new items proposed for development for the meat and dairy industry for the period 1976-1980, Minlegpishchemash has accepted only 72, 2 and 5 of these respectively for the first two years of the five-year plan.
4. "Material from the 25th Congress of the CPSU," Politizdat, 1976, p 47.
5. See A. Koshuta and L. Rozenova, "Capital Obsolescence and Price Formation," (VOPROSY EKONOMIKI, No 9, 1975, p 69).
6. By 1980, the output of STB and ATPR machines will comprise two-thirds of total loom production, while their proportion of the installed machine inventory will grow to 40 percent; the share of pneumatic spinning equipment within the overall spinning equipment inventory will come to 15 per cent by 1980.
7. Of special interest are the data on the satisfaction of demand for specific types of equipment. On the basis of this data we can identify disproportions in the supply of equipment for the same purpose but possessing various technical and economic performance indicators.
8. See, for example, V. K. Fal'tsman, "Prognozirovaniye potrebnosti v oborudovaniy" [Forecasting Equipment Requirements], Izd. Ekonomika, 1970, p 16.
9. The development of this procedure presumes the establishment of criteria which should form the basis for determining the requirements for equipment of specific classes, types and type sizes and of a standard base line for equipment utilization in terms of a variety of indicators. In our view, this now constitutes a basic scientific and practical task in this area.
10. See PRAVDA, 12 Jan 1978, p 2. The author presents data on meat losses in Bashkiriya due to this cause--600 tons per year. This figure would increase to several tens of thousands of tons for the country as a whole.

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11. According to calculations by specialists, food resources could be increased by 1 billion rubles solely by maintaining quality and eliminating unjustifiable product losses as a result of a shortage of refrigerating capacity (see, for example, Ye. Pospelova, "A Potential for Increasing Food Resources," VOPROSY EKONOMIKI, No 4, 1975, p 65).
12. In the course of the Ninth Five-Year Plan, equipment imports for the food industry as a whole increased by more than one-fourth as compared with Eighth Five-Year Plan and by approximately two-fifths for light industry. (See "Vneshnyaya trgovlya SSSR: itogi devyatoy pyatiletki i perspektivy" [The Foreign Trade of the USSR: The Results of the Ninth Five-Year Plan and the Outlook for the Future], Izd. Mezhdunarodnyye otnosheniya, 1977, p 41).
13. World market prices exceeded the 1970 level during 1975 2.1-fold, whereas that increase in the course of the preceding 5-year period totaled only 10 per cent. (See "Vneshnyaya trgovlya SSSR: itogi devyatoy pyatiletki i perspektivy," p 37).

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MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

REGIONAL POPULATION PROBLEMS AND USSR LABOR RESOURCES

Moscow REGIONAL'NYYE PROBLEMY NASELENIYA I TRUDOVYYE RESURSY SSSR in Russian  
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[Annotation, Foreword and Table of Contents from book edited by V. G. Kostakov and Ye. L. Manevich, Izdatel'stvo "Statistika", 4,000 copies, 287 pages]

[Text] One of the most important socio-economic tasks for developing the country's economy is providing for the rational utilization of labor resources throughout the country overall, and also by region. This monograph is directed toward that pressing problem. How do demographic processes influence the nature of the national employment situation? What is the specific nature of each republic's utilization of labor resources? These and many other problems are examined by the authors of books from all union republics.

This work is directed to specialists involved with the problems of accounting and planning relating to labor resources, economists, demographers, and also instructors of economic higher institutions of learning.

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#### FOREWORD

The contemporary stage of socio-economic development levies new requirements for demographic development and the utilization of labor resources of the country and individual territories.

At the XXV Congress of the Communist Party of the Soviet Union, attention was focussed upon the problems of demographic policy and the optimum utilization of the labor force. In his report to the CPSU (Communist Party of the Soviet Union) CC (Central Committee), L.I. Brezhnev stated: "To successfully resolve the multifaceted economic and social tasks facing the country, there is no other way except the rapid growth of labor productivity, a sharp increase in the effectiveness of the total public production process...During the Eighties, the resolution of this task will become particularly urgent. This is primarily associated with exacerbated problems with labor resources. We must not rely upon attracting additional labor forces, but upon the improvement of labor productivity"<sup>1</sup>.

In the collective monograph presented, for the first time in Soviet economic literature, an attempt has been made to examine population problems and ways to improve the utilization of labor resources in all union republics and the entire USSR as a whole.

The authors of the monograph are scientific personnel from the union republics. The primary task of the work is to establish basic mechanisms in the population reproduction and the optimum utilization of overall USSR labor resources and to indicate the most significant peculiarities for each union republic so that with consideration given those peculiarities, methods can be established to further improve the utilization of the labor force throughout the entire USSR national economy.

The collective of authors in the analysis of the demographic situation in the various republics proceeded on the premise that demographic policy in our country is disseminated to all union republics irrespective of past or existing birth rates and population growths. Identical conditions have been created in the Soviet Union for demographic development and for the upbringing of a healthy and well-developed generation of young Soviet people.

Additionally, an analysis of the peculiarities of life in each republic (climatic, national, attained level of development in a national economic sector, etc.) enabled the authors to formulate a number of hypotheses which might be given consideration in the development of demographic policy elements (development of service sphere, improvement of medical services, professional education of youth, particularly those living in rural areas of certain republics, a more active study program of the Russian language, and others).

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The monograph devotes considerable attention to questions relating to freeing the work force in conjunction with increased labor productivity, improved planning and material incentives, and migration. A great deal remains to be done to perfect the systematic process of freeing and distributing the labor force and its effective and optimum utilization in national economic sectors and in all the economic regions of our vast country. Through this we can achieve a further improvement in labor productivity under intensified socialist production. Here the authors proceed from the directives of the XXV Party Congress stating that "on the main conditions for the proportional development of the Soviet economy during the Ninth and subsequent Five-Year Plans is the optimum utilization of labor resources. The more dynamic the economy, the more rapidly its sectorial and territorial structure changes, and the more acute the task becomes to coordinate the development of material production and the non-production sphere with existing available labor resources"<sup>1</sup>.

Considering that there existed no opportunity in every chapter to consisely describe the basic problems of population reproduction and the optimum utilization of labor resources, primary attention, as a rule, is devoted to those problems, which, in the opinion of the authors, are of greatest interest for that republic.

In the writing of each chapter, the authors incorporated data and materials from research conducted in the republic during the past 10--15 years, and also data from the 1959 and 1970 population censuses.

The collective of authors and the editors of the monograph do not claim to have exhausted of this considerable and complicated national economic problem of our time, and would be satisfied if it renders assistance to scientific and practical personnel in their studies of problems in population questions and of labor resources in the regional context.

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OCCUPATIONAL SKILL STRUCTURE OF WORKERS

Moscow VOPROSY EKONOMIKI in Russian No 6, Jun 79 pp 55-65

[Article by V. Moskovich and V. Anan'yev]

[Text] One of the central national economic proportions to the balance of whose elements attention is required in working out socioeconomic development plans is the ratio of substantive and personal factors of production, its technical level, and the occupational, skill and social structures of the workers. Under present conditions, this problem has taken on increasing importance. On the one hand, accelerating scientific and technical progress objectively causes a certain separation between the technical level of production and the qualitative composition of the work force and, on the other, the demographic situation evolving makes it increasingly difficult to draw up planned projects which will provide additional manpower for the rates of production growth which have evolved in our economy.

The problem of balancing substantive and personal production factors has three aspects. It is first of all a problem of achieving optimum proportions between the technical structure of production and the occupational skill structure of the workers, between the scope of expanding production and the influx of manpower at an appropriate occupational skill level. Second, it is a problem of coordinating the interests of society and of the individual in choosing an area of occupational activity which will facilitate revealing his aptitudes and comprehensive development and which will meet the needs of the national economy. Third, it is a problem of the economic and social mechanism whereby balance can be achieved between substantive and personal factors and whereby the needs of the individual for particular types of labor can be channeled to meet social needs.

Analysis of the indicated aspects of this problem as they are interconnected and interact is of important significance to correctly posing and solving the problem as a whole.

The relationship of substantive to personal factors has quantitative and qualitative aspects. Under developed socialism, the quantitative aspect expresses: the presence of a stable balance between the number of existing

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workplaces, as well as those being introduced, and the number of workers actually employed in production activity; providing the entire population able to work and engaged in the production process with workplaces, which stems from the universal, obligatory nature of labor under socialism. The qualitative relationship assumes, on the one hand, providing production with manpower corresponding in its occupational skill structure to the workplace structure and, on the other, the creation of workplaces which meet the growing demands of the workforce as to labor content in terms of technical level.

Revealing the two aspects of the problem of balancing substantive and personal production factors and determining both the production and personal aspects in each of them provides an opportunity to outline ways of optimizing the occupational skill structure of the workers as a most important condition for increasing production effectiveness.

Constant coincidence of the actual number of workers and their occupational skill structure with that required for production is impossible. Development of the tools and objects of labor and technology is highly dynamic and has intensified in the contemporary scientific and technical revolution. The acceleration of technical development makes new demands on the workforce and its structure. The development of a machine complex proceeds, as is known, along the path of full mechanization and automation of a production process, which signifies the displacement of manual, unskilled and low-skill labor and expansion of the sphere of application of skilled labor. One in every five workers in the national economy already has a higher or secondary special education. According to our calculations, about 75 percent of the industrial workers are employed at skilled labor.<sup>1</sup> In the years ahead, the sphere of application of skilled labor will also be expanded under the impact of further progressive advances in the branch structure of the national economy. At the same time, skilled labor will itself become qualitatively more complex, serving as one manifestation of the heightened role of the skill factor in production. The demand will arise for extensive combining of worker specialties, for broadly specialized worker cadres for whom mental labor will play the dominant role. The number of workers with higher or secondary special educations who are employed at workplaces is systematically increasing. Thus, the number of workers in Moscow industry in 1975-1977 whose jobs required the skills of a specialist with a higher or secondary special education increased 21.3 percent, of which 32.0 percent needed to be filled by specialists with a higher education and 19.2 percent by specialists with a secondary special education.

As distinct from substantive elements of production, the development of the workforce proceeds in more inertial forms. It depends foremost on formation specifics of the subject of production itself -- the worker, his abilities,

1. The high proportion of skilled labor is to be explained by the complexity of its structure, which results from dissimilarities between the level of production mechanization and automation in industry and also from the fact that skilled workers will unavoidably include some semiskilled workers whose numbers are not broken out in statistics.

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and his adaptation to new equipment. The latter does not always occur sufficiently quickly. It now takes 12-15 years to develop a skilled worker, longer in the case of engineering-technical workers. And those numbers are tending to increase. At the same time, given the large-scale introduction of new equipment, we must draw into servicing the new equipment, in addition to young people who have received special or vocational training, people already working but in need of retraining -- requalification or skill improvement. The adaptation time for this category of workers is from several months to 1.5 years. Thus, there is a certain lag in all cases between the introduction of new equipment and training personnel for it.

The relativity of the ratio of substantive and personal production factors which results from the objective course of its development cannot, however, be a substantial hindrance to the reproduction process in and of itself. The disproportions which arise as a result of exacerbation of the contradictions between substantive and personal elements of productive forces under developed-socialism conditions can be eliminated thanks to the planned character of socialist production. However, to do this, one thing is absolutely essential. The linking of a worker to means of production is always mediated by the economic mechanism whereby the national economy functions. One integral part of it is the mechanism whereby a balance is achieved between the scope of production expansion and the manpower required to do it, between the technical structure of production and the occupational skill structure of the workers. The more effectively this mechanism performs its role as regulator of those processes, the higher the degree of quantitative and qualitative conformity of substantive to personal factors. If, in shaping the occupational skill structure, insufficient consideration is given to prospects for developing the technical base, the quantitative and qualitative incongruities of the two main elements can take on a long-term character, become persistent, and manifest themselves at all national economic levels.

A most important requisite to preventing profound disproportions is improvement in the existing management mechanism. This also applies to the mechanism whereby balance is achieved between substantive and personal production factors. The development of means of labor makes direct new demands on the quantitative and qualitative composition of the workforce functioning in material production. A lack of coordination in this regard is immediately reflected in each lower economic link and, what is more, in each workplace. The mechanism whereby balance is achieved among these factors must therefore possess great mobility, the ability to change its own forms quickly, rather than other components of the management mechanism.

At present, a number of disproportions have been revealed between the technical basis of production and the workforce functioning in it. Along with the quantitative disproportion between production's manpower requirement and the supply, which arose as a result of the operation of extensive trends in economic development (the number of people employed has systematically

1. We define training as the system of initial personnel vocational-technical training and retraining.

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exceeded the natural increment in labor resources in recent years), qualitative disproportions in the workforce have been aggravated. They are manifested in various ways. First, there is a sharp shortage of skilled workers for new enterprises. Among the factors delaying the full utilization of such capacities and having, for example, no direct relationship to the investment process, the shortage of skilled personnel is among the leaders (14 percent of all instances of delayed utilization). Of the projects released for operation and to have been at full utilization in 1975, the shortfall in skilled personnel was 60 percent for the Ministry of Machine Tool and Tool Building Industry, 59 percent for the Ministry of Light Industry and 34 percent for the Ministry of Food Industry. According to data from a survey done by RSFSR labor agencies, 67 percent of the enterprises put into operation in 1978 were not provided with skilled workers in the basic occupations.

Second, the level of skill of the workers is inadequate. Analysis of the actual provision of industry with manpower shows that the number of workers in the lower categories exceeds production requirements at many enterprises. In machine building and several other branches, the complexity of the jobs often grows faster than the skill level. One manifestation of this process is lag in worker skill categories behind their job categories. According to our calculations, it was 0.2 to 1.5 categories in the 1968-1973 period. This phenomenon continues. Thus, according to industrial enterprise data for 1976, the average piece-rate worker category was 3.26 and the average job category -- 3.5 at the Vladivostok China Plant; the figures were 3.1 and 3.43, respectively, at the Khabarovsk Power Machine Building Plant. At the "Pnevmostroymashina" plant in Moscow, the average lathe operator category was 3.0 and the average category of the jobs done -- 4.1; for milling machine operators the figures were 3.6 and 3.9, respectively, for tool makers -- 4.3 and 4.5, and so forth.

It should be noted that another trend also operates in industry, that is, for the worker's category to exceed the job category. However, in this instance as well, growth in actual skill often lags behind growth in the complexity of the job. A survey of a number of machine building plants showed that job categories are substantially inflated when worker wages depend on those categories. Another indirect proof of the overstating of worker skill levels is the fact that the introduction of new wage conditions has led to a reduction in the average worker rate category at many enterprises. At the Khabarovsk oil refinery, the average category of piece-rate workers was 3.96 in 1970 and 3.78 in 1976; at the Zhatayskiy Ship Repair Plant -- 3.4 and 2.9, respectively.

A distribution of workers based on rate categories done by the USSR Central Statistical Administration in 1975 showed that in a number of branches of industry the average worker rate category dropped (from 3.5 in 1972 to 3.2 in 1975 in light industry, from 3.4 to 3.3 in woodworking, from 3.6 to 3.5 in forestry) or remained unchanged (3.1 in 1972 and 1975 in machine building and metalworking).

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The lack of conformity of worker skills to production needs leads to a reduction in labor productivity and to an increase in defects, production accidents and unplanned maintenance. In recent years, unplanned maintenance accounted for 7.7 to 12.8 percent of all shift-long down time for metal-cutting, forge-and-press, casting and arc welding equipment. Survey materials show that 13.1 percent of all electricity-related accidents in branches of the national economy occur due to worker skills failing to conform to the job being done.<sup>1</sup> Thus, this indicator increased 3.1-fold from 1970 to 1976 at the Zhatayskiy Ship Repair Plant; it increased 1.6-fold at the Khabarovsk Power Machine Building Plant, nearly two-fold at the Blagoveshchensk Garment Factory, 1.4-fold at the Vladivostok Tool Plant and 2.5-fold at the Blagoveshchensk Electrical Equipment Plant. In industry and construction as a whole, output norms are not being met in considerable measure due to the inadequate skill level of more than a million piece-rate workers. Nearly two-thirds of them are employed at machine building and light industry enterprises.

Elimination of the disproportions which have evolved will require the development of a complex of measures aimed at further improving the economic mechanism whereby balance is achieved between substantive and personal production factors. In particular, the capital investment policy must take into account the additional manpower demand which is arising. The role of qualitative indicators in enterprise and association activity which facilitate improvement in worker skills should be increased. The rate system and bonus system must provide greater incentives for occupational skill, for mastering new specialties and occupations. Personnel training determines the relationship of those employed in the national economy in terms of occupation and qualification. Change in this relationship will depend largely on the occupational skill structure of the workers being trained.

In order to optimize the worker training structure in accordance with production requirements, it is necessary to further improve planning the need for workers by occupation and qualification at all levels of national economic management. In this connection, particular importance is taken on by revelation of the reasons for discrepancies between occupational-technical training planned indicators and production requirements, and by the development on that basis of new forms and methods of calculating the actual needs of the national economy for skilled manpower.

The calculations should first of all, in our view, be differentiated by form of planning -- current, medium-range (five-year), long-range and forecast (20-30 years), as well as by level of planning -- national economy, branch and production-structural subdivisions -- associations and enterprises in an occupational skill cross-section.

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1. Calculation made based on data from G. Yu. Gordon, V. I. Filippov and Z. A. Yarochnenko in "Elektrotravmatizm na proizvodstve" [Electricity-Related Production Accidents], Lenizdat, 1973, p 21.

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It is appropriate to determine the demand for skilled manpower in greatest detail at the association and enterprise level, where the workforce is directly combined with the means of production, and where the available equipment structure and the production program are coordinated on the basis of normatives. Such detailed calculations can be made only within the framework of current planning. Branch requirements must be determined on the basis of centralized calculation methods for a consolidated products list, within the framework of medium-range and long-range planning and organically linked to the scientific-technical forecast for branch development.

National economic medium-range and long-range planning must be done, in our opinion, based on type of training, with a corresponding breakdown by period and year and with consideration of a number of very important socioeconomic factors: the demographic situation, occupational mobility, interchangeability of occupations, and so forth, linked directly to corresponding development plans for the economy, science and engineering.

It follows from the above that the leading role belongs to the branch system of planning worker training. It is precisely here, where the demand must be revealed by group of technologically related occupations and broadly specialized occupations, that conditions are created for organizing the training process on the basis of general technical knowledge, with subsequent narrow specialization right on the job in accordance with enterprise and association current requirements.

The system of balance calculations which is the basis for determining the additional demand for skilled workers requires considerable improvement. It is now carried out using various methods, sometimes not comparable, without proper consideration of the impact of technical progress factors on change in the occupational skill composition of the workers and without the necessary coordination of annual and five-year or branch and territorial calculations. The current demand for certain occupations, which is transferred in one form or another to the long-range view and made the base for planning worker personnel training, has been made the basis of such balance calculations. At the same time, it is precisely now, under conditions of scientific and technical progress, that transferring the manpower demand of today's occupational skill structure to the long-range view means knowingly causing this structure to not conform to production demands.

It seems to us that we must reject the drawing up of balance calculations to determine the additional manpower requirement based on current production needs. It is more appropriate to perform these calculations on the basis of an analysis of changes in the occupational skill structure of the workers as the result of the introduction of new equipment and technology. In this connection, enterprises must begin making one-time surveys (once every three years) to reveal the occupational skill structure required with consideration of planned enterprise retooling. That must also serve as the initial base for planning personnel training.

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Of important significance in the system of economic levers facilitating optimizing the occupational skill structure of the workers is improvement in the financial and material-technical security of worker training and retraining. At present, the equipment requirements of schools of the vocational-technical education system are being met by 10-15 percent. Therefore, a substantial portion of the machine tools and other equipment of academic institutions is obsolete or obsolescent. The introduction of new seating capacities is far from meeting the planned level or production needs. In a number of branches of industry, the number of study-course combines, study sectors and workshops provided with modern equipment and classrooms is approximately one-third of the established normatives. At the same time, the creation of this kind of study complex at large and medium-sized enterprises permits a sharp reduction in the amount of individual-brigade apprenticeship, improvement in the quality of occupational training for young workers and the retraining of personnel being freed for other work.

One of the main causes of this situation is the inadequate feasibility of financial plans for providing the material base for occupational training. Attention to this problem must be intensified, in particular, because in the long term, funds used for these purposes will increase. According to calculations done by the Central Scientific Research Institute of Experimental Design for School Buildings, the cost of adding one student-place in vocational-technical schools in 1976-1990 will have increased 17 percent over 1971-1975, with consideration of factors lowering that cost. Present rates of technical progress demand the practical introduction into vocational-technical school financing of equipment accounting and wear, of equipment service life normatives, and also of providing production workshops (especially at vocational-technical schools [PTU] at which pupils receive a secondary education) with new equipment from the initial lots of industrial series production.

Further expansion of the PTU network, which provides occupational training for young worker personnel and foremost for new construction projects, plays a special role in the system of stimulating stationary forms of training.

The organization of skilled worker training for new construction projects has been entrusted to the ministries with jurisdiction over such projects. At present, the average annual demand for additional worker personnel for new enterprises is 750,000 to 800,000 persons. The vocational-technical academic institutions have yet to assume the leading role in providing facilities scheduled for start-up with workers to operate them. At the same time, plan assignments for new enterprises have heretofore not, as a rule, indicated the demand for and sources of securing skilled workers in an occupational skill cross-section. Also lacking are normatives for allocating funds to build PTU's. Corresponding USSR ministries and departments have been given the right to set the amounts of capital investments for vocational-technical schools being built. At the same time, though, they are also the customers for construction of these projects.

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The necessity has arisen of working out a complex of scientifically substantiated proposals on determining the manpower requirements of new enterprises in an occupational skill cross-section and on improving the financing mechanism whereby workers are trained in the vocational-technical education system. In our view, expenses on building vocational-technical schools and on training personnel to operate newly-built enterprises, including those in the most common occupations, must be included in total capital investments on a target basis, and the normatives for deducting funds for this purpose must be set in percentages of the amount of capital investment in that particular branch.

We must improve the use of funds allocated to build PTU's. According to USSR Central Statistical Administration data as of 1 July 1976, only three of the 48 union-republic ministries and departments met the Ninth Five-Year Plan goals in 1971-1975. During the first three years of the current five-year plan, not one construction ministry besides the USSR Ministry of Construction carried out the vocational-technical school construction program. Considerable lag was also permitted by the USSR Ministry of Chemical Industry, USSR Ministry of Nonferrous Metallurgy, USSR Ministry of Tractor and Agricultural Machine Building, USSR Ministry of Power and Electrification, and other branch ministries.

The fuller utilization of capital investments released for these purposes would, in our view, be facilitated by changing the proportions between budgetary allocations and enterprise funds in favor of the former. At present, the bulk of the capital investments in vocational-technical education is financed through the enterprise's own funds, but enterprises do not have corresponding equipment and materials resources to do this. This explains to a certain extent the considerable amounts of unutilized planned funds, the prolonged construction time for vocational-technical education projects, and the high percentage of unfinished construction.

Also in need of improvement is the mechanism whereby funds are generated to train and retrain workers in branches of industry. Expenditures on improving the system of worker training and retraining should be viewed as part of renovation expenses. The processes of renovation and change in the occupational skill structure of the workers are closely connected, and the latter directly influences change in the personal factor of production. In this connection, along with enterprise and association funds to finance personnel training and retraining, we consider it appropriate to draw in centralized funds as well. Special worker vocational-technical training funds should be created separately from the renovation fund, inasmuch as the processes of technical restructuring and forming a new occupational skill structure might not coincide over time. Shaping a new structure might be a long process, so in a majority of instances the amounts of funds for personnel training will be determined by forthcoming expenses on improving the availability of equipment to production. The necessity of having a separate worker training fund also results from the fact that society must know how much it is spending and must spend in the future on expanded reproduction of the personal factor of productive forces.

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Training funds must be created at both the enterprise and association levels. The renovation of existing enterprises is being done periodically. Were these funds to remain at the disposal of the enterprise, they would be frozen for long periods, but the accumulation of funds in the associations would permit their more efficient use. We should also study the question of including target funds for personnel training and retraining in a single science and technology fund of the industrial ministries.

Among the problems whose practical resolution creates conditions for improving the level of worker personnel occupational training organization is the elimination of departmental and organizational lack of coordination in the personnel training system. This lack of coordination creates difficulties when drawing up a balanced development plan for the technical structure of production and adequate manpower for it. The existing practice of drawing up admission and graduation plans based on type of training continues to be such that student enrollment in the general educational schools, tekhnikums, PTU's and in production developed without the necessary interlinking with and realistic consideration of the social requirements as to workers' educational levels.

At the same time, the very structure of worker occupational training requires major improvement. The reference is to the ratio of stationary forms of training to individual-brigade apprenticeship, to the creation of continuity in the various forms of occupational training, to the development of unified programs and the establishment of unified training periods by skilled-labor occupation, regardless of where the training takes place. The formation of a unified system of worker occupational training and the creation of an efficient structure of general, special and vocational education are the most important conditions for continued improvement in the balance between substantive and personal production factors.

Providing workers with workplaces that match their occupational skill profile is of essential importance in shaping the qualitative ratio of production elements to manpower. It is important in this regard to give consideration to regional features of worker distribution by occupation and skill. The USSR Constitution states that citizens of the Soviet Union have a right to labor, including the right to choose their occupations, kind of employment and job in accordance with their calling, abilities, occupational training, education, and with consideration of social requirements (Article 40).

The personal interest of the worker in performing labor functions in a given occupation and at a given level of skill represents the realization of a personal need to participate in social labor. This interest is foremost material. Obviously, a worker can best meet his material needs by doing a job for which he is inclined. But the worker's interest also includes other aspects: the striving to meet his understanding of the prestige of his occupation, to actualize the education he has obtained, to advance in position, to improve his skill, and so forth. The personal interest workers have in performing labor functions thus expresses their socioeconomic needs.

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The demand for creative, interesting labor occupies an increasingly large place in the structure of worker needs. This has been facilitated by the rise in their educational level. Thus, the proportion of workers with a higher or secondary (complete or incomplete) education in all branches of the national economy had reached 73.2 percent in 1977, as against 39.6 percent in 1959 and 8.4 percent in 1939. The role and importance of workplaces which provide the worker with an opportunity to meet his own need for creative, interesting labor is therefore growing in the aggregate of labor incentives. It is precisely this feature which leads in shaping the workers' socialist way of life at the present stage.

However, there are still jobs in which unattractive, difficult labor predominates. Thus, 24.6 percent of industry workers are employed in manual jobs (not at machines or machinery), among which jobs are a significant number involving heavy physical labor. The proportion of unskilled and low-skill labor is high at auxiliary jobs, where 74 percent of the workers are employed in unmechanized jobs.<sup>1</sup> The unattractive types of labor must include labor on the conveyor, with its forced work-process rhythm and the monotony of the labor operations in flow-line mass production. At a number of machine building enterprises, 22-25 percent of the basic production workers are thus employed, and in light and food industry -- 80 percent. Naturally, under present conditions, when young people who generally have a secondary education<sup>2</sup> are the basic source of securing additional manpower, the available workplace structure cannot fully meet their interests.<sup>3</sup>

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1. According to data from a one-time recording of the occupational composition of workers, the number of transporter-carriers, drawers and janitors at machine-building and metalworking enterprises in 1975 had increased 2.7-fold as compared with 1965, considerably exceeding the growth in the total number of workers employed in this branch.
  2. Whereas labor resources increased by a total of 29 percent in the Seventh Five-Year Plan due to young people coming of working age, the figures were 57 and 88 percent in the Eighth and Ninth five-year plans, respectively. Young people already comprise the overwhelming majority of workers in the most common occupations. Thus, about 600 of every 1,000 milling machine operators are young people, about 578 of every 1,000 turners, and about 558 of every 1,000 spinners (see EKO, No 4, 1977, p 30).
  3. According to USSR Ministry of Education calculations, 14 million boys and girls will graduate from complete secondary schools in the 10th Five-Year Plan, nearly half of whom will become institute and tekhnikum students. About eight million people, including 7.5 million with complete secondary educations and 0.5 million with incomplete secondary educations, will enter the national economy from schools (see T. V. Ryabushkin and A. Z. Dadashov, "Trudovyye resursy: effektivnost' ispol'zovaniya" [Effectiveness of Labor Resources Use], Znaniye Izd-vo, 1977, p 46).

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The practice which has evolved of combining specialties does not help meet the need for interesting labor either. Recently, approximately 11 percent of all workers improving their production skill each year have taken courses of training in second or related specialties. According to the data of a survey made in Leningrad, 60-70 percent of the skilled workers in category III or above have mastered second or third specialties, especially in metal-working and fitting-assembly shops. The present technical level of production provides 12-15 percent of the workers with opportunities for combining specialties. However, as a survey made by the Scientific Research Institute of Labor at 40 machine-building enterprises shows, after the new wage conditions were introduced, the number of workers combining specialties did not exceed five percent at a majority. All this provides an opportunity for assuming that some workers trained in second specialties are not always using the occupational skills acquired. Given the critical shortage of skilled manpower, it is as if surplus skill has been formed as a result. This is also indicated by the surplus in skilled workers in individual occupations as compared with the actual need for them, in particular, of maintenance men and adjusters. Combining the functions of set-up and adjustment with maintenance work, as well as with certain types of basic jobs, would reduce the number of set-up men by nearly 25 percent.

This situation involves two kinds of consequences. First, there are direct national economic losses the failure to use all workers' skills is reflected in labor productivity growth. Raising the level of specialty combining at machine-building enterprises to the average would ensure labor productivity growth of two to 2.5 percent and increasing it to the level of the leading enterprises would lead to labor productivity growth of 4-5 percent. Second, the fact that his knowledge goes unactualized causes the worker to be dissatisfied with his labor, which increases personnel turnover, reduces worker output, and facilitates more defects.

Thus, research done by the Ural'sk Science Center of the USSR Academy of Sciences at Pervoural'sk industrial enterprises shows that 22.5 percent of all workers left production for occupational reasons, the leading ones being dissatisfaction with one's occupation, lack of growth prospects, and the failure of the job to conform to one's specialty.<sup>1</sup> According to the data of a survey by the Central Scientific Research Laboratory of Labor Resources of the RSFSR at 105 enterprises of various industrial branches, the main reason workers ages 16-29 leave jobs is dissatisfaction with their job or occupation, unpreparedness of secondary school graduates to work, and so forth. As a rule, job changes involving leaving a particular enterprise are accompanied in 40-50 percent of the cases with changes in occupation, with working time losses of 25-30 days while looking for a new job, with a reduction in labor productivity of 10-20 percent for the first 2-3 months on the new job, and

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1. See: "Population and Labor Resources Movement in the Industrial City" in "Trudy Instituta ekonomiki Ural'skogo nauchnogo tsentra AN SSSR" [Works of the Ural'sk Science Center of the USSR Academy of Sciences' Institute of Economics], Sverdlovsk, 1978, p 9.

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with retraining expenditures which are not socially necessary. All this in the end lowers national economic effectiveness.

An important direction in eliminating the qualitative lack of agreement between substantive elements of production and the workforce with regard to meeting personal labor interests is accelerating the introduction of the achievements of scientific and technical progress, creating conditions (economic and technical) more favorable to mechanizing basic and auxiliary jobs, and introducing into production new equipment which will eradicate low-skill and unskilled labor. Unfortunately, evaluating the work of structural subdivisions of production and the forms of encouraging their activity are still definitely oriented towards volume-quantitative indicators, which permits obtaining high evaluations while releasing obsolete equipment.

The number of workplaces requiring the use of low-skill labor is being substantially reduced and the labor process is being "optimized" on mechanized flow lines (enriching labor content and making it more attractive). The reference is to replacing conveyors with a forced rhythm with short conveyors with a pulsing rhythm or movable platforms.

The system of stimulating progressive forms of labor organization, and combining specialties in particular, also requires further improvement. The primary directions in this process must be organizing specialty combining on the basis of technical planning, creating multipurpose and all-around brigades, and expanding the introduction into production of interbranch and branch labor expenditure normatives which provide the enterprise with an opportunity to plan the combining of specialties and heightening the material interest of the workers in disseminating it.

Ensuring balance between both substantive and personal production factors is an essential factor in carrying out the program for increasing national economic efficiency which was worked out by the 25th CPSU Congress.

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MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

HIGH-QUALITY TRAINING OF SPECIALISTS SEEN AS SOCIAL PROBLEM

Moscow KACHESTVO PODGOTOVKI SPETSIALISTOV KAK SOTSIAL'NAYA PROBLEMA (The Quality of Specialist Training as a Social Problem) in Russian 1978 signed to press 26 Oct 78 pp 1, 2, 3-9, 164-165

[Title page, annotation, table of contents and introduction from book by D. I. Zyuzin, Izdatel'stvo "Nauka", 4,900 copies, 166 pages]

[Text] The book is devoted to a crucial and inadequately investigated problem: increasing the effectiveness and quality of training of specialists at higher educational institutions. The book analyzes the qualitative and quantitative evaluations of specialist training in the higher schools, social factors in increasing the effectiveness of the training and educational process and the utilization of young specialists in the national economy.

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Introduction

[Excerpts] The CPSU Central Committee and the Soviet State have always devoted a great deal of attention to the problems of improving the quality of training of specialists in higher schools.

Historically, the work for improving the quality of preparation of specialists with higher qualifications has proceeded along the following paths: 1) raising the level of the general educational base for the enrollment in VUZ's; 2) increasing the requirements made on the level of general educational training and introducing entrance examinations for all categories of secondary school graduates as well as competitive selections; 3) improving the quality of the staff and increasing the qualifications of teachers; 4) improving training plans from the point of view of a maximum reduction in the number of specialties and the establishment of their composition, taking into account the prospects for the development of specific branches of the national economy and the achievements of science and technology as well as the need to provide a broad general theoretical base for full mastery of a given specialty; 5) developing and strengthening the material base of the higher school and improving the material and living situation of the students; 6) improving the forms of methods of training and education in VUZ's.

These ways of improving the quality of specialists training have not lost their importance even at the present time. Under the conditions of the modern scientific and technical revolution there is an extraordinary increase in the role of the personal, "human" factor in all areas of social life, including in the system of higher education, which was not clearly present in previous investigations of the system of education in general and the pedagogical process in particular. Until recently, however, the students were considered only as an object of influence from outside whose duty consisted in taking in the knowledge that was presented.

The recognition of the role and significance of the personality of the pupil or student in the training and educational process gave rise to extensive literature which deals with the various aspects of the student's life, which are related primarily to his life's plans, his value orientations, his subjective aspirations and his socio-psychological characteristics which reflect the student's activity in educational work. At the same time, we are conducting research related to a study of the objective qualities of the pupils and students--their social origin and social position.

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The broad scope of the problems and the complexity of the subject matter related to investigating the student of the subject and object of the training process have even given rise to a desire to limit the focus of the forming science--the sociology of education--to a study of precisely the socio-psychological aspects of the student's life activity. Other aspects have been investigated within the framework of the economics of higher education, pedagogic, psychology and so forth.

As the subjective and personal factor in higher education is investigated more and more deeply, it becomes clear that this factor, being dialectically related to the objective conditions of the development of the system of higher education, essentially influences the entire educational process.

The inclusion of the personal factor in the theory of education has given it a certain finality. It has become obvious that the system of education must be considered not only as a means of satisfying society's needs for specialists, but also as a means of satisfying the needs of the individual, particularly of youth, for education as a social institution in a socialist society.

This circumstance radically changes the conception of the field of sociology of education. "The sociology of education can be defined as a special, applied sociological science which has as its subject the system of education as a social institution, the interaction of its subsystems and also the interaction of the system of education and its subsystems with society."\*

The concept of a social institution makes it possible to change over from a study of individual aspects of higher education to the creation of an integral theory of the process of training personnel for the national economy, to single out criteria of effectiveness, and to trace the connections between society and higher education and the reverse effect of the system of higher education on the development of the society, whose needs the system of higher education is called upon to satisfy. A consideration of higher education as a social institution requires a study of the goals set for it by society in each stage of socio-historical development and those concrete means with which these goals are achieved and also a study of the organizational forms of the system of higher education.

In the modern stage of development of the socialist society the effectiveness of the system of higher education can no longer be evaluated just by the number of specialists who are graduated. It is necessary also to take into account the level of their training in keeping with the requirements of the national economy and their moral, civil and socio-political qualities. In the decree "On Further Improvement in Training and Education of Students in General Educational School and Preparing Them for Labor," the CPSU Central Committee and the USSR Council of Ministers drew the attention of the USSR Ministry of Education, the USSR Ministry of Higher and Secondary Specialized Education,

\* Filippov, F. R. "Vseobshcheye sredneye obrazovaniye v SSR" [Universal Secondary Education in the USSR], Moscow, 1976, p 5.

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the councils of ministers of the Union republics, managers of pedagogical training institutions and party organizations to the need "to raise the level of the training and educational process in training institutions; to reinforce its ideological and theoretical tendency, devoting special attention to the preparation of young specialists for educational work in the schools; to provide for more efficient utilization and assignment of them; to improve the selection of youth for pedagogical training institutions; and to conduct systematic and purposive work for inculcating in students and pupils a deep respect for the profession of the teacher, a feeling of civic duty and responsibility for work in the school."\*

The criterion for the effectiveness of the system of higher education, consequently, should be looked for not only in the system itself, but above all in the degree to which its "products" correspond to society's needs for specialists, both quantitatively and qualitatively. Hence follows the important requirement of studying the process of training of specialists in the higher school as it is inseparably connected to their utilization in the national economy.

It is necessary to keep in mind that the nature of the utilization of specialists in the national economy exerts a reverse influence on all the activity of the higher school and above all on the activity of the students in the training and educational process, social and political practice, and on their life plans and orientations.

Planning occupies an important place in increasing the effectiveness of the higher school. The training of specialists in volumes that exceed the society's actual requirements have a negative effect on the quality of their training. Thus, a surplus of specialists in one specialty or another or as a whole leads to utilizing them in positions that do not require a higher education and, therefore, the prestige of higher education declines among the population, competition in VUZ's decreases, conditions for selection become worse and, consequently, the initial conditions for the training of specialists are not as good.

If the concept "social institution" makes it possible to study the "structure" of higher education, the interconnection and interdependency of its individual subsystems, and to trace the connection between higher education and society, then the concept "social process" makes it possible to define the content of the functions of higher education, its stages as in "ontogenesis," that is, in the training of one "generation" of students as in "phylogenesis," that is, in the process of the historical development of the system of higher education. The study of any social phenomenon as a social process requires the determination of necessary and sufficient conditions whose interaction gives rise to a given phenomenon, that is, contributes to its establishment and change and to its development in general. The mutual interchange of these conditions from one to the other determines the content of the social process.

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\* PRAVDA, 29 December 1977.

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The necessary and sufficient conditions for higher education considered as a social process are the same factors that constitute the system of higher education as a social institution--the national economy's need for specialists with higher qualifications and the population's need\* for a higher education. But now we consider them not from the standpoint of quantity, quality and structure, but from the standpoint of the interaction and intertransformation which take place as a result of the higher school's activity.

The factors influencing the results of educational activity in the higher school, considered as a process, will be characteristics and properties of the system of higher education as a social institution. Since these latter are functions of the society, in the final analysis the society as a whole thus exerts an influence on the results of higher education as a social process--the level of development of productive forces, the nature of production relations, the cultural level of the population, the moral atmosphere and many other things.

The methodological points that have been presented determine the structure and content of the study of the problem set in the present work. First of all, it is necessary to consider higher education as a social institution and as a social process and to explain the position and role of specialists with higher qualifications in the national economy as well as the nature and content of their labor, since only on the basis of such an analysis is it possible to formulate the requirements for the quality of specialists with higher qualifications, requirements made by the socialist society in the current stage of its development.

The requirements on the qualities of specialists are, in turn, the basis for formulating the goal of the system of higher education as a social institution, which determines the nature and content of the activity of the latter as well as the structure of the means at its disposal for achieving the goal that faces it.

The formation of the contingent of students is the first stage of higher education when it is considered as a process.

The training and educational process is its second stage. Here it is necessary to trace the influence of objective factors on the results of the student's activity in the VUZ and also to characterize the student as the subject of training, to explain the sources of his training activity and to determine the degree of their influence on the quality of training of specialists for the national economy.

The final stage of higher education as a social process is the distribution and utilization of young specialists, that is, the satisfaction of the society's need for them. In this stage the degree of effectiveness of the

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\* The term "population's need" is used here collectively, designating the total need of individuals for higher education.

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system of higher education is revealed since the criterion for the effectiveness of the activity of the higher school lies beyond the limits of the training process--in the sphere of labor. Therefore, it is necessary to analyze the nature of the connection between the higher school and all branches of the national economy, to study the nature and content of the labor of young specialists as well as their labor and sociopolitical activity, to reveal the dependency of the results and intensiveness of their labor on their training and sociopolitical activity in the VUZ, and to explain the degree to which the requirements placed on the student in the VUZ and the criteria for his activity correspond to the requirements set by practice and the criteria for evaluating the labor activity of young specialists.

The classics of Marxism-Leninism and party and government decisions on questions of the development of higher education served as a methodological base for the development of the main problems of this book.

Certain materials from research conducted in 1973-1975 by the collective of scientific workers of the sector of education and youth of the Institute of Sociological Research of the USSR Academy of Sciences, with the direct participation of the author,\* constituted the information base for the work. Only the data from questionnaires distributed among students and pupils of Moscow and young specialists who were VUZ graduates were used in the present work. These data made it possible to trace the interconnections between VUZ training of specialists and their production activity. Data from state statistics were also used.

The main goal of our research was to explain the objective and subjective factors that determine the quality of training of specialists and their utilization in the national economy.

Participating in gathering information and questioning young specialists were workers of the sector for youth and education of the Institute of Sociological Research of the USSR Academy of Sciences, T. S. Baranova, T. G. Yablonskikh, N. V. Andrushchak and also V. A. Kutsenko. The mathematical processing was done under the leadership of the senior scientific worker, V. A. Afanas'yev.

Part 3 of chapter 3 was written in conjunction with V. A. Afanas'yev.

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\* "Vysshaya shkola kak faktor izmeneniya sotsial'noy struktury razvitogo sotsialisticheskogo obshchestva" [The Higher School as a Factor in the Change of the Social Structure of the Developed Socialist Society], Moscow, 1978.